



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/937,979	01/23/2002	Stuart Speakman	M0274/7029	8937

23628 7590 01/16/2003

WOLF GREENFIELD & SACKS, PC
FEDERAL RESERVE PLAZA
600 ATLANTIC AVENUE
BOSTON, MA 02210-2211

EXAMINER

PADGETT, MARIANNE L

ART UNIT	PAPER NUMBER
----------	--------------

1762

7

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/937,974

Applicant(s)

Speakman et al

Examiner

M.L. Padgett

Group Art Unit

1762

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Statu

- ☒ Responsive to communication(s) filed on 1/23/02
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 77 - 147 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 77 - 147 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☒ All ☐ Some* ☐ None of the:

- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____

☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Action Summary

Art Unit: 1762

1. Claims 77-147 are objected to or rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In the claims, incorrect use of articles showing antecedent basis is objected to. Only previously introduced limitations, or those that are immutable quantities should use the articles "the" or "said". See for example: "the technique" in claims 77, 139, 140 and 141, lines 3 or 5; "the solidity" in second to last lines of claims 77 and 139; "the structure" in line 11 of claim 141, etc... Conversely, previously introduced limitations should employ those articles to indicate antecedent basis. See for example, "droplets" in claims 77 or 139 or 140, lines 8 or claim 141, line 10 or claim 147, lines 5 and 7; or "deposition material" in line 3 that was previously introduced on line 2 of claim 147. Thorough proof reading of this lengthy set of claims for like problems is needed.

✓ Claim 95 appears to be contradicted by claim 96, which depends therefrom, as "a source integral with..." is singular, and is opposed in meaning to "a plurality of sources spaced along...", which is plural. Clarification is needed.

In claim 97, alpha particles, which are protons are NOT electromagnetic radiation, but particulate radiation, unless applicant is trying to invoke the wave-particle relationship and say that all matter can be described as waves, i.e. all matter is electromagnetic radiation?

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. German patents DE 43 29 338A1 and DE 42 28 344A1, were rated X, anticipatory in the PCT Search Report, but as these references are in German they cannot be further evaluated at this time. Translations have been ordered, but not yet received.

4. Claims 77-79, 81-85, 87-92, 95, 97, 109, 112, 118-120, 122, 125, 128-130, 134, 136, 138-140 & 147 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith, Jr. et al.

Claims 80, 86, 93-94, 96, 98-108, 110-111, 112-117, 121, 123-124, 126-127, 131-133, 135, 137 & 141-146 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith, Jr. et al.

Smith, Jr. et al (Smith) teach a “drop-on-demand” deposition process, taught to be useful for delivering various materials, including molten metal, solder feed stock, metal pastes, semiconductor, dielectric, various polymer, such as epoxies and mixtures, with applications in

Art Unit: 1762

electronics manufacturing, micromachining, adhesives, etc. The drops are taught to be delivered with minimal distortion, where trajectory is electrostatically controlled to thus determine path, speed and consequent solidification of the particle. The solidification is further controlled through chemical reactions, temperature (heat, freezing, etc) as the drops transit the controlled environment of the chamber, i.e. from the nozzle to the substrate. See the abstract; figures, esp. 1, 2 & 12; col. 2, lines 11-25 and 60-col. 7, line 42 and line 64-col. 4, line 42; col. 8, lines 11-15; and col. 9, lines 20-60. Note that use of electrostatics to control trajectories comes under the broad claim of use of electromagnetic radiation and is in the operating zone. On col. 4, lines 22-30, the suggested heat source for maintaining liquid temperatures includes induction heaters, which also employ electromagnetic radiation. Col. 4, lines 31-42; col. 8, lines 26-36; and col. 12, lines 17-30 illustrate Smith's process' use in circuit board patterning, mention use of liquid metal, solder, etc. Col. 4, lines 49-63 discuss nozzle structure and expelling fluid with pressure burst, that appears related to preventing clogins as well as useful for cleaning purpose. The magnetic fields discussed in col. 4, line 64-col. 5, lines 4 & 15-23; and col. 7, lines 45-67⁺, are also an application of electromagnetic radiation. Col. 6, lines 10-49 discuss use of and generation of an electromagnetic field for control of delivery, as by causing the jet to break into droplets after exiting the delivering tube, thus further discussing electromagnetic radiation as claimed. Col. 9, lines 53-61 notes the use of charge to prevent unwanted microspheres from depositing, and collection thereof for recycling. Col. 11, lines 24-49⁺ discusses fig. 1, and notes in lines 45-49 that other heating (18) arrangements of the nozzle may be employed, including IR radiation and induction heaters, thus reading on further forms of electromagnetic radiation that may be employed. Use of typical sources for induction heating, such as RF or microwave would

Art Unit: 1762

have been obvious given these suggestions. Col. 12, lines 1-17 further discuss use or limiting of charged and uncharged particles, and control of charge build up by employing catcher 30, which corresponds to a nozzle shutter. An more detailed section on applications is found in col. 22, lines 13-col. 24, lines 20, including soldering techniques, with potential use in integrated circuit boards; direct deposition of circuit patterns and devices, using metal or conductive epoxies (col. 22); repair, interconnecting modules and chips; marking and pattern generation (using polymers and epoxies), or metals; fabrication of masks for use in patterning, as for circuit boards or soldering, etc. Mention is made of etching in the section on masks, but it is inconclusive whether or not it uses a mask to etch, or is etching one, but either would have been obvious in view of the disclosure, and suggestion to make further modification.

For the independent claims, generic masks and circuit patterns are explicitly covered, and since the spacer pattern has no determinable meaning except a pattern with spaces, it is covered by patterning. Other particular masking uses not specifically mentioned, are obvious variation on masking as taught associated with integrated circuit construction, soldering, printing and marking or repairing uses, etc. While making a relief pattern is not explicitly discussed, fabrication of patterns and other 3-D structures is specified (col. 23, lines 27-37 and 47-53), and relief patterns which are old and well known types of products, are just an obvious variation on these concepts, hence consistent with Smith's suggestion for further modification (col. 24, lines 7-20), especially as use of rollers and transfer of depositions is standard procedure for relief printing processes. While Smith does not specify the particular device(s) used to supply IR for heating/heat control, use of any conventional light/radiant energy transmission device would have been expected to be effective. Operating parameters and dimensions would have been

Art Unit: 1762

determined by routine experimentation and optimization for specific materials and desired end results. It is further noted that the number of such devices would have been chosen according to their efficiency and effect, and the number of deposits and nozzles would have been chosen according to desired product, its size and design/pattern requirements therefore. Further requirements such as relative motion or printing or flexible substrates, pretreatment are standard patterning or printing techniques, hence obvious for their conventional uses.

5. Claims 97-104 & 143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith as applied to claims 77-147 above, and further in view of Adler or Hallman et al.

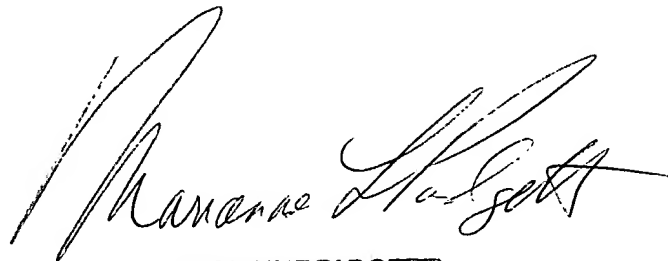
While Smith may use IR in the above process, and may deposit various polymers, the option UV radiation is not taught, nor is curing of deposited materials, however Alder shows that use of UV for curing an analogously deposited polymeric material is known in the art, hence would have been an obvious modification to suggested polymeric depositions in Smith et al, especially in light of their suggestion to make various changes such as substitution of specific materials. Note while Adler does not provide teaching of specific UV source devices, conventional means of supplying such would have been obvious as expected to be so employed effectively, since the use of UV was suggested. Adler also illustrates use of flexible substrates and roller supports provided for the deposition process, which is supportive of above assertions.

Hallman has analogous teaching, to provide analogous obviousness for use of UV and its sources (abstract; figures; col. 4, lines 46-col. 5, line 55), with further teaching of epoxy, which corresponds to polymers employed by Smith.

6. Heine-Geldern et al provide cumulative teaching showing usefulness of pre- and post-treatments with electrostatically deposited material.

Art Unit: 1762

7. Any inquiry concerning this communication should be directed to M L. Padgett at telephone number 703-308-2336 on M-F from about 8 am-4:30 pm, and FAX#(703) 872-9310 (regular) & 305-6078 (informal).

A handwritten signature in black ink, appearing to read "Marianne Padgett", with a large, stylized initial "M".

**MARIANNE PADGETT
PRIMARY EXAMINER**

M. L. Padgett/mn 01/07/03
January 7, 2003
January 15, 2003

P.S. The translation for DE 42 28 344A1 has now been received, but not yet reviewed.

01/14/03